REVIEW REPORT

on the

WELDING PROGRAM

OCTOBER, 2000

Executive Summary

This is the second review of the UCC Welding Program, the first having taken place in 1989. The Welding Program Review Committee identified one area of concern that is in need of immediate attention: the state of the Welding facility at Williams Lake, where both noise and air pollution levels are in violation of Workers' Compensation Board guidelines. For three years, since Welding's move to its current temporary facility, these problems have gone unaddressed, and further procrastination would not only endanger the health of the instructor and students there, but also put UCC at risk of a WCB injunction. The Committee suggests a series of solutions whose moderate expense would be far outweighed by the increased safety of Welding personnel and students at Williams Lake.

A second concern is instructor unavailability on the shop floor. One of the reasons for this is the constant diversion of the instructors , particularly at the Kamloops campus, into taking phone messages and dealing with the registration requirements of drop-in students: "testers," upgraders and challengers. The Committee recommends that the responsibility for responding to inquiries from industry and the public be shifted to clerical support within the Trades and Technology, thus freeing the instructors to concentrate on their primary task of instruction. Other suggestions here are insistence on pre-registration of all drop-ins, and voice-mail messages indicating when instructors are available to take "live" phone-calls.

The issue of program efficiency has already been partially addressed. In 1999-2000, Welding achieved only a 60% utilization rate; by maintaining the same enrolment rates, and by cutting 10 funded FTEs from this year's (2000-01) funding profile, the program should achieve an 80% utilization rate. However, program faculty and administrators should be aware that program efficiency levels are under scrutiny by the funding body, the Industry Training and Apprenticeship Commission, and that every effort should be made to improve utilization. Some strategies suggested by the Review Committee are including testers, upgraders and challengers in the FTE count, as well as building a third line of Welding onto the eight FTE made available through the Career Technical Centre initiative.

Indeed, expansion rather than contraction may be the key to the program's future. Structural changes such as the proposed amalgamation of the Welding 'C' and Welder/Fitter Programs, and the development of a Welding Technology Program should enhance the training provided and put UCC's program at the forefront of Welding programs in the Province.

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WELDING PROGRAM EVALUATION COMMITTEE MEMBERS

CHAIR	Dr. Henry Hubert Dean, Arts, UCC
ASSISTANT CHAIR	Peter Poeschek Chair, Construction Trades, UCC
EXTERNAL REP.	Rob Sauve Maintenance Supervisor Weyerhaeuser Canada Ltd.
RESOURCE PERSON	Bruce Jenkins Welding, UCC
RESOURCE PERSON	Joe Rille Welding, UCC
RESOURCE PERSON	Les Wiebe Welding, UCC
DEPARTMENTAL CHAIR	Dave Wharf Mechanical Trades and Welding
DIVISIONAL DEAN	Don Graham Dean, Trades and Technology, UCC
REVIEW CO-ORDINATORS	Dr. Alastair Watt Director, Institutional Research and Planning, UCC Dorys Crespin-Mueller Research Analyst, Institutional Research Michaline Novak Research Analyst, Institutional Research

CHRONOLOGY OF THE WELDING PROGRAM REVIEW

The UCC Welding Program was first reviewed 11 years ago, in 1989. This review, its second, was started on April 4, 2000, with a meeting between Welding instructors Joe Rille and Les Wiebe and the Office of Institutional Research and Planning to discuss the focus of the review and process and to initiate questionnaire construction. A further meeting on May 1 finalized the questionnaire design. Bruce Jenkins, the Williams Lake Welding instructor, was kept abreast of developments via email, telephone and inter-departmental mail.

Stakeholders in the Welding Program were surveyed on the following dates:

Current students (Kamloops):	May 3, 2000
Current Students (Williams Lake):	May 9, 2000
Faculty:	May 4, 2000
Advisory Committees (Kam & WL):	May 5, 2000
Former students (Kam & WL):	May 5, 2000
Employers (Kam & WL):	May 8, 2000

In addition, five years of data (1995-1999) on the UCC Welding Program were obtained from the BC Colleges and Institutes Student Outcomes Survey Results, via the Student Outcomes Reporting System (SORS).

All three faculty members responded by May 12, 2000. Reminders were mailed to non-respondents in the Former student, Advisory Committee categories on May 19 and to Employers on May 23. Telephone follow-up was conducted between June 2 and 6, and again between June 21 and 22.

The cut-off date for all responses was July 20, 2000. Information binders were sent out to members of the UCC Welding Program Evaluation Committee on July 29, and that Committee met to discuss and analyze the data and formulate its recommendations on August 24 and 25, 2000.

PROGRAM BACKGROUND

Since the last program review, we have seen major changes in the Welding Program. We now have a new facility with much better equipment, lighting and ventilation. Our fabricating equipment has all been upgraded. For two full-time instructors, we have record numbers of students, upgraders and testers. All the equipment on the Welding bus has been upgraded to current standards. We have numerous contacts with BC Hydro and weekend courses. Twenty-one BC Hydromechanics have graduated from the Level C Program in the past six years as a result of the mobile training. This year we plan to do an advanced program for them.

The Williams Lake program is also experiencing a much higher demand than in the past. Unfortunately, due to a lack of time release, we are unable to communicate with Bruce Jenkins as much as we should.

The past five years has seen us take on much more administrative duties with no time release. This is a cost to the students and will likely be reflected in our evaluations. Although the move to a new facility was a positive one in many respects, there was no time release provided and much of the work was done by faculty during vacation and PD time.

The Technology booth being developed as a partnership between UCC and Air-Liquide and a Welding Technology program will keep UCC in the forefront of Welding training in BC. UCC faculty have always been and continue to be involved in Provincial curriculum upgrading and test bank updating. We were also fully involved in the development of the Provincial Welder Fitting Skills Program which is now complete.

ADMISSIONS INFORMATION

Level "C"

Program Description

Welding is an industrial art in a highly competitive field. It requires constant physical coordination of arms, hands and eyes, and the student develops manipulative skills through manual training.

Related gas welding and arc welding theory, basic metallurgy, basic blue print reading, applied mathematics and principles of safety are some of the technical subjects covered. On completion of the course a student will have gained sufficient practical experience and related theory to take a variety of job tests.

The welding trade is universal in its application. Construction welding appeals to certain people due to the variety of working locations, while others prefer to remain in the industrial centres, where employment opportunities occur in practically every mechanical or metal trade.

Due to technological development, welding equipment and techniques are constantly changing; thus welders, though employed, should constantly strive to update their skills.

Note: Following successful completion of Level "C" Welding and 5 months of employment as a welder, the student can obtain the registered "C" stamp.

Admission Requirements

a) Educational Requirements
1) Grade 10 minimum, however, Grade 12 is strongly recommended
2) Satisfactory achievement on the Entry Assessment tests

b) General Requirements
1) Chest x-ray
2) Successful medical
3) Good command of English language is recommended
4) Good vision, unimpaired hearing, respiration and good health in general are recommended.
5) Interview with program instructor.

Length of Program

Seven months

Note: Students are strongly recommended to complete the Welder/Fitter program immediately upon conclusion of the Level "C" Welding program. Work experience components may be awarded to students who have demonstrated the ability to perform successfully in the industry. Evaluation of the work term will be performed by industry and the program instructor. The results of the work term will become part of the student record.

Dress

Students must supply own gloves, jackets, goggles, helmet and safety-toed boots.

Levels "B", "A", Testing and Upgrading

Program Description

Levels "B" and "A" contain training in advanced S.M.A.W. (Shielded Metal Arc Welding), G.M.A.W. (Gas Metal Arc Welding), F.C.A.W. (Flux Cored Arc Welding) and G.T.A.W. (Gas Tungsten Arc Welding) plus related knowledge in Advanced Metallurgy and Advanced Blueprint Reading.

Admission Requirements

a) Educational Requirements
1) Must have a "C" stamp for Level B
2) Must have a "B" stamp for Level A

b) General Requirements
1) Successful medical
2) Chest x-ray
3) Interview with the program instructor
4) Good vision, unimpaired hearing, respiration and good health in general, are recommended

Length of Program

- Level "B" is four months.
- Level "A" is two months.

Dress

Students must supply own boots, gloves, jackets, goggles and helmet.

Upgrading

Students enrolled as an upgrader may fine tune their skills in a specific area such as pipe welding with S.S. electrodes in the SMAW or GTAW processes. They may also work toward testing to specific Prequalified Welding Procedure (PWP) certification, as well as many other company or union specified procedures.

Testing

Company and government tests are offered. The instructor will advise as to the paperwork required by companies and by the Boiler Inspection Branch. The instructor will oversee the administration of the tests and arrange for inspection by the Boiler Inspector.

Welder/Fitter

Program Description

This ten week program extends the welder's skills into reading blue prints and doing layout work. Graduates will be qualified to work in structural steel construction, and in metal fabrication shops in construction and maintenance industries. (space permitting)

Note: The Welder/Fitter program is also available to Level B and Level A graduates.

Course Content

The program consists of eight courses, four practical and four related theory. The ratio of practical to theoretical training is approximately 2 to 1. The primary emphasis in the program will be on developing a thorough working knowledge of reading shop drawings, layout and assembly procedures. Materials handling and proper and safe use of shop equipment will be integrated with the learning and skill development components in the fabrication projects.

Admission Requirements

a) Educational Requirements
1) Grade 10 minimum, however grade 12 is preferred.
2) Successful completion of B.C. Level "C" Welding program or its equivalent.

b) General Requirements
1) Chest x-ray
2) Successful medical
3) Good command of English language is recommended
4) Good vision, unimpaired hearing, respiration and good health in general are recommended.

Length of Program

Ten weeks.

Dress

Students must supply own gloves, jackets, goggles, helmet and safety-toed boots.

TABULAR SUMMARY OF QUESTIONNAIRE RESPONSES
WELDING PROGRAM REVIEW

Recipient	# Sent	# Completed & Returned	% Returned
Faculty	3	3	100%
Advisory Committee			
Kamloops	11	4	36%
Williams Lake	7	3	43%
Employers			
Kamloops	13	5	38%
Williams Lake	17	10	59%
Former Students:			
Kamloops	69	25	36%
Williams Lake	30	7	23%
Current Students:			
Kamloops	15	15	100%
Williams Lake	4	4	100%
SORS Data (BC College and Institutes Student Outcomes Data (1995-1999)	216	146	68%
TOTAL	**385**	**222**	**58%**

SUMMARY OF QUESTIONNAIRE RESPONSES

FORMER STUDENTS

Ninety-nine surveys were sent out to former students who have attended the Welding Programs in Kamloops and Williams Lake. Thirty-two questionnaires were returned for a response rate of 32%. The majority of former students were male (30) and two were female, with 50% of them between the ages of 18 and 24. The minimum requirement needed to attend the Welding Program is grade 10, but 81% of the respondents had completed grade 12 or higher prior to being admitted to the program. Most of the respondents (75%) are employed in jobs related to the training received through the program.

Former students rated the general program effectiveness and quality of instruction very highly. At the Kamloops campus the facilities and equipment were also rated highly. At the Williams Lake campus the facilities and equipment were not rated as high.

The major concern expressed by former students at the Kamloops campus was the lack of instruction on the shop floor and the unavailability of instructors to provide feedback, help or demonstration for the students. These students also raised concerns about the number of errors in the Welding Program modules. The major concern expressed by former students at the Williams Lake campus was the noise created by and the ineffectiveness of the fume extraction system as well as the small size of the shop. They were also concerned that the equipment is not very technically current.

CURRENT STUDENTS

The current students rated the program very highly for preparing them to enter the workforce. They also rated the quality of instruction very high. At the Kamloops campus the current students agreed with the former students and rated the facilities and the equipment very highly. They also agreed with former students about the number of errors in the Welding Program modules. Current students at the Williams Lake campus agreed with the former students, expressing the same concerns regarding the lack of newer equipment and the fume extraction system.

PROGRAM ADVISORY COMMITTEE

Seven members (41%) of the total Program Advisory Committee members in Kamloops and Williams Lake completed the questionnaires. They agreed with the responses of both the current and former students about the quality of the program, instruction, facilities and equipment. They identified through the questionnaire the need to be prepared to train more people due to the anticipated retirement of welders in the near future.

EMPLOYERS

Of the 15 employers from the Kamloops and Williams Lake area who responded to the questionnaire, 12 of them have hired graduates of the Level "C" Welding Program. They commented that the program provides a good quality worker, with a positive attitude and a good working knowledge of basic welding skills.

Thirteen (87%) of the employers would support a mandatory merging of the Welder/Fitter Program and the Level "C" Welding Program. Employers also identified that more student work that simulates the conditions and pressures found in a competitive welding industry would be a great asset for graduating students of the program.

FACULTY

The entire program faculty responded to the questionnaire (n=3). The faculty **strongly agrees or agrees** that the program objectives, admissions requirements and curriculum meet the requirements of industry. The faculty members agree with past and current students' concerns regarding lack of instruction on the shop floor at the Kamloops campus and the number of errors in the Welding Program modules. At the Williams Lake campus the faculty member agrees with the concerns expressed by past and current students about the facilities (fume extraction system and shop space) and training equipment.
The following other concerns were raised:

- Lack of funding from the Industry Training and Apprenticeship Commission for the correction and upgrading of the curriculum through the Welding Articulation Sub-committee
- Lack of information regarding the Welding budget
- Lack of chair support for the past six years
- The need for a Welding Technology Program
- Admissions and cashier inefficiencies for registering students attending only for one day.
- Lack of release time for proper communications between the Kamloops and Williams Lake campuses.
- Lack of institutional support to complete the Welding Technology booth.

STRENGTHS OF THE WELDING PROGRAM

The Review Committee has identified the following strengths in the Welding Program:

1. **Instruction, Facilities, Equipment:**
   A major strength of the Welding Program at UCC is the excellent quality of the instruction, the equipment and the facilities. The students indicate this as a major contributing factor for their success in the Welding program. The Williams Lake student surveys indicated the quality of instruction was also excellent and contributed greatly to their success in the program.

2. **Employer Satisfaction:**
   Employers are generally pleased with the quality of the skills and the good attitude of the graduates of the Welding Program. Employers indicate that the Welding Program curriculum provides students with a solid foundation in the basics of the Welding Trade. The Industry Training and Apprenticeship Commission (ITAC) representatives also confirmed that welding apprentices and their employers are pleased with the training provided at UCC.

3. **Technological Currency:**
   The UCC Welding faculty has kept up with the latest technology quite well by forming industry partnerships. This has made sure the most technically current equipment is available to be used by students. This also provides an excellent link to the local industry as their welding staff can also be trained at UCC on how to operate these new pieces of equipment.

4. **Program Flexibility:**
   The UCC Welding Program is very flexible and has demonstrated this by changing its program to offer the Welder/Fitter component so that it meets the requirements of the local industry, which differ from the needs in other areas, especially the Lower Mainland and even the Okanagan Valley. The UCC Welding faculty has tried to accommodate ever person possible trying to up-grade their skills. The UCC Welding Program accomplishes this by offering a flexible continuous enrollment or mixed line for all levels of welding certification including Level C students, Level B, A students, Level 1-4 Apprentices, upgraders and testers.

5. **Certified Testing Centre:**
   A key in the success of the Welding Program is the level 2 Welding Inspector certification of Les Wiebe, one of the UCC Welding Program instructors. Les's qualifications allow UCC to be a certified testing centre, a feature of great benefit to the local industry, in which welders must be re-certified for certain welding procedures every two years.

AREAS OF THE WELDING PROGRAM WHICH CAN BE IMPROVED (WITH RECOMMENDATIONS)

The Welding Program Review Committee identified the following areas for improvement in the Welding Program:

1. PROGRAM STRUCTURE and CURRICULUM

Combining Level C and Welder/Fitter

The Welding Program Review Committee learned that the present provincial practice of teaching the Level C Welding course followed by the Welder/Fitter course leads to unnecessary classroom duplication and student frustration. Given the general employment needs for students graduating from the UCC Welding Program (as opposed to specialized opportunities for students graduating from programs in the Lower Mainland or even in the Okanagan Valley), the recommendation to combine the Level C class with the Welder/Fitter class was unanimously supported by employers, faculty and students interviewed by the review committee.

The Welding Program Review Committee therefore recommends:

a) **That, where feasible, the UCC Welding Program, both in Kamloops and Williams Lake, combine the Level C Welding course with the Welder/Fitter course into a single, integrated course taught at a length appropriate to course needs and instructor availability;**

Action: Welding Faculty; Chair, Mechanical Trades; Dean, Trades and Technology

b) **That the UCC Executive support the Welding Articulation Committee's recommendation that Welder/Fitter be combined with Welding C in the provincial curriculum, and that it endorse a re-writing of the provincial curriculum to achieve that effect.**

Action: UCC Executive; Dean, Trades and Technology.

Teaching Modules and Test Banks

The problem of errors in the provincial curricular material was also discussed by both former and present students, and affirmed by the instructors. The problem seems to have originated when the curriculum was revised to fit into small modules. The work appears to have been done by editors not familiar with welding, with the problem compounded by copying between word-processing packages. The problem has been identified by the Provincial Articulation Committee, which has been told that ITAC has allowed time for curricular upgrading, but to date the UCC Welding Program has not seen any action or funding. Obviously erroneous curricular material not only decreases course efficiency, thus raising costs, but it also undermines program credibility for students, leading to both student/faculty difficulties and to unnecessary student frustration.

The instructors added that test bank material also needs upgrading. The test bank material at UCC is essential in keeping the program efficient, especially when students work independently. Such independent work increases program efficiency, thereby also decreasing potential costs. Discussions regarding time for instructors to upgrade the test bank have taken place at UCC, but no time has been provided as reportedly promised.

The Welding Program Review Committee therefore recommends:

c) **That ITAC immediately provide funds to upgrade course materials, with all the work, save for the secretarial/editorial component, done by Welding faculty;**

Action: Welding Faculty, Dean, Trades and Technology; ITAC

d) That ITAC establish an ongoing efficient system of corrections and upgrading for course materials.

Action: Welding Faculty; Dean, Trades and Technology; ITAC

e) That resources be found to allow updating of the UCC testbank (TLM) program.

Action: Dean, Trades and Technology; V-P Instruction and Student Services

Career Technical Centre (CTC) Students, Student Demand

The joint UCC/School District CTC Program appears poised to add eight high school students to the UCC Welding Program. This would make up 50% of a normal faculty workload if this class were taught as a combined Level C and Welder/Fitter course of 180 instructional days. This would allow the addition of another eight students from those waitlisted. The additional Level C students would also build demand for Level B classes, which this review found to have lower enrolments than other classes.

According to the Welding faculty, the current relatively low waitlist numbers reflect only a portion of the demand for Welding at UCC because when classes are full, faculty advise students to apply elsewhere rather than enter their names on the waitlist. In addition, the Registrar's Office may also cut off applications at a given point each academic year, so that even the application numbers may reflect a lower than actual demand.

The Welding Review Committee also notes that if an additional line of students were introduced into the program, that line could begin earlier in the day than the present class. If the new class opened daily in the classroom, no new tool room attendant would be needed and the welding shop would increase its utilization during the day.

The Welding Review Committee therefore recommends:

f) That, if eight new CTC students enter the UCC Welding Program, they form 50% of a new Welding line to be taught by a third instructor; and

Action: CTC Coordinator; Welding Instructors; Chair, Mechanical Trades; Dean, Trades and Technology

g) That this new line take the integrated Welding Level C and Welder/Fitter curriculum.

Action: Welding Instructors

Welder Technology Program

Following a year's study leave for Nick Martin in 1982, UCC initiated a Welder Technician Program in 1983. According to the 1989 UCC Welding Program Review, however, the new program foundered from lack of student interest. Given the success of the present Welding program, with needs for aspiring welders to ladder into advanced areas, given the need for specialists to serve industry in the area of quality control and to communicate the needs of engineers to trades people, and given the absence of such a program in British Columbia, the time has come to re-examine the potential for a Welder Technology Program at UCC. The concept has the support of the faculty, the Trades and Technology Division, of industry, and, reportedly, of the UCC Vice-President of Instruction.

The Welding Program Review Committee therefore recommends:

h) That UCC establish a Program Advisory Committee to guide a study into the feasibility of mounting a Welder Technology Program.

Action: Welding Faculty; Chair, Mechanical Trades; Dean, Trades and Technology; V-P Instruction and Student Services

Release Time for Program Development

This report recommends a number of activities to improve the efficiency of the Welding Program at UCC, both in Kamloops and at Williams Lake. Given the present workload of instructors, this additional work should be supported by release time for projects such as resurrecting the Welding Technology Program, negotiating with industry equipment for the Welding Technology Booth, revising the admissions procedures, training the Learning Resource Centre (LRC) clerk, and working with the Program Advisory Committee.

The Welding Program Review Committee therefore recommends:

i) **That the Welding instructors draw up a list of activities, with appropriate release time estimates to discuss with their Chair and Dean, and that the Dean and V-P Instruction provide the necessary release.**

Action: Welding Instructors; Chair, Mechanical Trades; Dean, Trades and Technology; V-P Instruction and Student Services

2. SUPPORT SERVICES

Instructional Support- Kamloops

Surveys of both former and current students identified the problem of students lacking access to instructors on the shop floor in Kamloops. This issue was also identified in the 1989 Welding Program Review, so it is a problem extended in both time and severity. The current Review Committee learned that telephone inquiries often led to instructors being absent from the shop floor. The Committee also learned, however, that the UCC Welding Program offers invaluable assistance to local industry through its testing program, both by its flexibility and its expertise. To remain current, welders must be certified through testing every two years in certain procedures; UCC offers this certification service. Often tests are required on very short notice, since projects cannot commence if welders' certification has expired. In the 1999/2000 year, UCC offered testing (and often related upgrading) to 103 individual welders. In addition, Welding instructors offer telephone advice to numerous potential program applicants.

The Welding Program differs from some other UCC programs in its flexibility beyond its testing service. For instance, the Program has very few apprentice students, and the second line of instruction is made up of seven different components (non-apprentice levels A, B, C, and apprentice levels 1-4) in addition to upgraders and testers. The Welding Program also offers short service courses to other UCC trades programs.

At present, UCC offers little clerical assistance to the Welding Program, and no regular release time. The present problems of student access to instructors were somewhat less severe when the department chair was also a welder, but since Ralph Finch left the Welding Department, the problems have increased. The fact that Les Wiebe has advanced testing credentials simply exacerbates the problem of access as he is often engaged in testing activities during regular instructional time.

The Welding Program Review Committee sees the remedy to this problem as increasing support to the Welding faculty rather than offering release time, which would further rob students of instructor contact. Further, to some extent the problems in the Welding area reflect shared problems throughout the trades area. Resources to fund the additional support might be built into the third line of Welding resulting from the new CTC program (see CTC discussion above.)

The Committee therefore recommends:

a) **That UCC revise the Learning Resource Centre (LRC) clerk's job description to include relevant instructional support, especially telephone support; and**

b) **That UCC increase the hours of the clerk, if necessary;**

c) **That the Welding instructors develop standard response sheets for most frequently asked questions relating to testing and course inquiries, to assist the LRC clerk in answering questions as well as in sending out relevant responses, but that LRC clerk have the option of contacting the instructors on the shop floor, if necessary; and**

d) **That the Welding instructors strive as much as possible to reserve telephone advising to non-instructional time, for example, by indicating on their voice-mail that they are available only after 3 p.m.**

Action: Welding instructors, Chair, Mechanical Trades; Dean, Trades and Technology; V-P Instruction and Student Services

Another non-instructional area requiring attention was found to be in the area of materials handling. When shipments of materials, not only for Welding but also for other trades areas arrive, they are formally received by support staff not dedicated to the trades area. Hence, much of the material must be handled twice, first by the receiving support staff, and then again by the relevant faculty. In addition to duplication, this practice can lead to misplaced and broken material. Moreover, simple services presently supplied by the UCC Facilities personnel could be more efficiently provided by support staff dedicated to the Trades and Technology Building.

The Welding Program Review Committee therefore recommends:

e) **That UCC provide dedicated support to the Trades and Technology Building, either by incorporating the necessary support into the job description of the present toolroom attendants, by redeploying present support staff to the Trades and Technology Building, or by hiring an additional employee on either a full- or part-time basis, as deemed necessary through consultations among the Trades and Technology Department chairs, the Dean, and the Human Resources Department.**

Action: Trades and Technology Building Chairs and Dean; V-P Instruction and Student Services

Registration Liaison

Because of the variety of students and offerings in the Kamloops Welding Program, especially the flexibility necessitated by the upgrading and testing services, the registration of students and auditing of student activity have posed difficulties. Indeed, the Review Committee was uncertain whether all of the teaching activity in the Welding Program is being captured in official reports. From the information presented, the program, funded at 59.6 FTE, was operating at 60% efficiency in 1999-2000 with an actual FTE count of 35.8. This is far below the maximum potential of 88%, given UCC's Collective Agreement of 180 annual teaching days (vs. the 205 days in the ITAC funding calculations). The issue may be one of under-reporting rather than of actual weak enrolments. The problem may also arise from the (necessary) mixing of ITAC-funded students and fee-paying upgraders/testers in the second line of the Welding Program in Kamloops, with insufficient or no FTE credit being allocated for the latter category of students.

The Review Committee learned that for the current year (2000-01) funding for 10 FTEs was lost to the program. Even with the reduction of funded FTEs, the program will still only operate at 80% efficiency, assuming no change in enrolment levels and in registration and auditing practices. The Welding faculty, the chair and the Dean, Trades and Technology should be aware that continued weak utilization reports could lead to the loss of further funding from either ITAC or UCC, or both.

The Welding Program Review Committee therefore recommends:

f) That the Registrar, the Dean of Trades and Technology, and the Welding instructors review current registration procedures, clarifying the registration status of *all* students in the mixed line of the Welding Program, assuring that the maximum number possible be registered in ITAC-funded programs.

Action: Registrar; Dean, Trades and Technology; Welding Instructors

The registration problems mentioned above are possibly linked to the fact that many upgrading and testing students have difficulty registering without undue disruption. Students coming in for periods as brief as only one day are now required to pay fees in person at the cashier in Old Main. Under pressure to complete their exams, students resent this inconvenience—and the potential exists for some to avoid payment owing to the confusion surrounding the registration process.

The Welding Program Review Committee therefore recommends:

g) That the Registrar, the Director of Finance, the Dean, Trades and Technology, and the Welding instructors review current registration processes, and incorporate the LRC clerk and online procedures into the registration process, which should insist on pre-registration and pre-payment, perhaps via debit and credit cards.

Action: Registrar; Director of Finance; Dean, Trades and Technology; Welding Instructors

Fee Structure Review

Given the cost of material and welding consumables in the Welding Program, especially in upgrading, the program may be somewhat undermined by offering services at too low a cost.

The Welding Program Review Committee therefore recommends:

h) That the Welding Program review its cost structures relative to the costs of materials and charges set by other provincial programs.

Action: Welding Instructors; Chair, Mechanical Trades; Dean, Trades and Technology

3. FACILITIES - KAMLOOPS

Technology Booth

The Welding Program Review Committee was continually impressed with the close relationship between instructors and industry. Suppliers often provide the Welding Program with expensive equipment for demonstration to industry. Access to new equipment keeps Welding instructors current and enhances both the credibility and the effect of the program with students.

In some cases, incorporating the newest equipment requires additional resources. Equipment for the Technology Booth has been offered, but the booth, which has been constructed, needs more work before this equipment can be delivered. A well equipped Technology Booth would significantly enhance the potential of the Program for present welding students as well as for industry. The new equipment would also better position UCC to introduce the first Welder Technology Program in the province.

The Welding Program Review Committee therefore recommends:

a) **That UCC review opportunities for completing the Technology Booth**

Action: Instructors, Chair, Dean, V-P Instruction and Student Services

4. PROGRAM ADVISORY

Strengthen Ties with Program Advisory Committee

A number of UCC programs have difficulty sustaining the interest of Program Advisory Committee members.

Given the value of the PAC for the Welding Program, the Review Committee recommends:

a) **That the Welding Program consider breakfast or lunch meetings, as well as brief educational or professional talks to entice PAC members to meetings, and**

b) **That the Welding Program consider inviting PAC members from beyond the immediate geographical area.**

Action: Welding Instructors; Chair, Mechanical Trades

5. FACILITIES – WILLIAMS LAKE

Noise Extraction – Williams Lake

The ambient noise level in the Williams Lake welding facility leaves UCC open to potential compensatory legal action by students or to closure by WCB. A March 1, 1999 report by UCC's Occupational Health and Safety Department states unequivocally that "UCC must provide engineered noise control . . . to reduce worker exposure to or below the exposure limit of 85 dBA." The report indicates that the air extraction system alone runs at the maximum acceptable limit, with the result that any and all additional noise raises the noise level above the maximum. Hence, with the air extractor system running, no further activity should take place.

Teaching in this atmosphere of students wearing double hearing protection (ear plugs and muffs) itself would be difficult, but the problem of wearing muffs is itself a problem, given the need for welders to wear helmets. The 1999 report indicates that the office and classroom are also affected by this noise, so they are not "areas of refuge."

Clearly, the Williams Lake facility is not conducive to good teaching, and UCC presently requires both faculty and students to work in an unsafe environment. The instructor has not made an issue of the problem, fearing that the program might be cancelled. This fear should not be a factor in this decision, nor should the program be threatened for this reason. The program offering should be based on UCC's mission and the community's need. The Review Committee heard that, given the heavy equipment needs of local industry, the Williams Lake Welding Program is essential to the community.

The Welding Program Review Committee therefore recommends:

a) **That UCC immediately install air extraction equipment complying with WCB standards in the temporary Welding facility at Williams Lake in such a way that it can be moved to and re-installed in the new facility when that is ready.**

Action: Dean, Trades and Technology; Dean, Williams Lake; Vice-President, Community and Distributed Learning; Director, Facilities

The noise problem is exacerbated by much of the machinery in the welding shop. At the time the extractor system is modified, some of this noisy equipment might be moved outside as well, as identified in the March 1999 report.

The Welding Program Review Committee therefore recommends:

b) That UCC immediately comply with the recommendations made for noise abatement in the UCC Occupational Health and Safety Report of March 1, 1999.

Action: Dean, Trades and Technology; Dean, Williams Lake; Vice-President, Community and Distributed Learning; Director, Facilities

Support for Williams Lake Welding Program

Difficulties with the Williams Lake Welding Program recently have been increased by its lack of proximity to other programs. This temporary isolation is increased by other problems in financing, planning, and professional support. Student and community support to the Williams Lake program is strong, the instructor is qualified, capable and enthusiastic, and the Williams Lake program is obviously vital to the economic welfare of the community.

The Welding Program Review Committee therefore recommends:

c) That travel funds and time for both the Chair and the Williams Lake instructor be reviewed to ensure adequate support for travel to and from Williams Lake; and

Action: Chair, Mechanical Trades; Williams Lake and Kamloops Deans; V-P Instruction and Student Services

d) That funding per FTE for the Williams Lake program be reviewed to ensure that it is on par with that of Kamloops; and

Action: Chair, Mechanical Trades; Williams Lake and Kamloops Deans; V-P Instruction and Student Services

e) That the Williams Lake faculty be included in the planning of the new building; and

Action: Dean, Williams Lake; V-P, C&DLS.

f) That a minimum of 16 welding booths with technically current equipment be allowed in planning for the new building.

Action: Chair, Mechanical Trades; Dean, Williams Lake; V-P, C&DLS.

APPENDIX A
METHODOLOGY

The data was collected in the following ways:

1) Consultation took place with Les Wiebe, Bruce Jenkins and Joe Rille, Instructors, Welding Program, on the design of the surveys.

2) Surveys were administered to Welding faculty, current students, former students, employers, and program advisory committee members. All data were processed using SPSS to achieve frequency rates and mean responses. Subjective comments for each group were recorded separately and anonymously. Additional former student data from 1995-1999 graduates of the program were summarized from Student Outcomes Reporting System (SORS) data, as provided by the Centre for Education Information, Standards and Services.

1) "Descriptive Data" on the Welding Program's objectives, course outlines, etc., were solicited from Les Wiebe and Joe Rille, Instructors, Welding Program.

2) Data on annual FTE utilization rates, graduation rates, gender and grade distributions were provided by the Office of Institutional Research and Planning.

3) Two members of ITAC (Industry Training and Apprenticeship Commission), Don Smith and Dave Horvath, as well as Pat Vicars, chairperson of the Welding Program Advisory Committee, and a former student of the Welding Program participated in interviews during the program review committee meetings.

APPENDIX B
PROGRAM CAPACITY AND DEMAND

Source: Admissions

Program Demand Kamloops:

WELDING A

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 - 97	10	0	0	10
1997 - 98	5	0	0	5
1998 - 99	5	0	0	5
1999 - 00	8	0	0	8

WELDING B

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 – 97	5	0	2	7
1997 – 98	13	0	1	14
1998 – 99	15	1	0	16
1999 – 00	9	0	3	12

WELDING C

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 – 97	22	11	35	68
1997 – 98	21	0	0	21
1998 – 99	20	0	0	20
1999 – 00	16	10	35	61

WELDER/FITTER

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 – 97	0	0	0	0
1997 – 98	15	0	0	15
1998 – 99	14	0	1	15
1999 – 00	10	0	1	11

WELDING UPGRADE

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 - 97	101	0	0	101
1997 - 98	74	0	0	74
1998 - 99	80	0	0	80
1999 - 00	103	0	0	103

WELDING APPRENTICESHIP

	1996/97	1997/98	1998/99	1999/00	TOTAL
Level 1	8	4	5	5	22
Level 2	3	9	1	4	17
Level 3	6	2	9	6	23
Level 4	7	3	7	4	21
TOTAL	24	18	22	19	83

** Numbers are for period of September 1996 to June 2000. Data provided by Welding faculty.*

Program Demand Williams Lake:

WELDING A

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 - 97	1	0	1	2
1997 - 98	3	0	0	3
1998 - 99	1	0	0	1
1999 - 00	0	0	0	0

WELDING B

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 – 97	2	0	0	2
1997 – 98	2	0	1	3
1998 – 99	5	0	0	5
1999 – 00	4	0	0	4

WELDING C

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 – 97	13	0	2	15
1997 – 98	15	4	9	28
1998 – 99	12	10	10	32
1999 – 00	13	3	12	28

WELDER/FITTER

Year (Sep-Aug)	Enrolled	Waitlisted	Incomplete/denied/ Withdrew	Total Applications
1996 – 97	2	0	1	3
1997 – 98	8	0	0	8
1998 – 99	9	0	2	11
1999 – 00	0	0	0	0 cancelled

APPENDIX C
WELDING FTE UTILIZATION

APPRENTICESHIP

	1995 - 96	1996 - 97	1997 - 98	1998 - 99	1999 - 00
Funded FTE:	1.0	0.7	1.0	3.2	1.6
Actual FTE:	3.0	6.6	3.0	3.6	2.5
Utilization Rate:	300%	943%	300%	112%	156%

WELDING A

	1995 - 96	1996 - 97	1997 - 98	1998 - 99	1999 –00	2000 - 01
Funded FTE:	2.0	2.0	2.0	2.0	2.0	2.0
Actual FTE:	1.6	1.1	1.3	1.2	1.6	
Utilization Rate:	80%	55%	65%	60%	80%	

WELDING B

	1995 - 96	1996 - 97	1997 - 98	1998 - 99	1999 - 00	2000 - 01
Funded FTE:	14.0	14.0	14.0	14.0	14.0	13.6
Actual FTE:	5.4	2.6	2.6	6.2	4.2	
Utilization Rate:	39%	19%	19%	44%	30%	

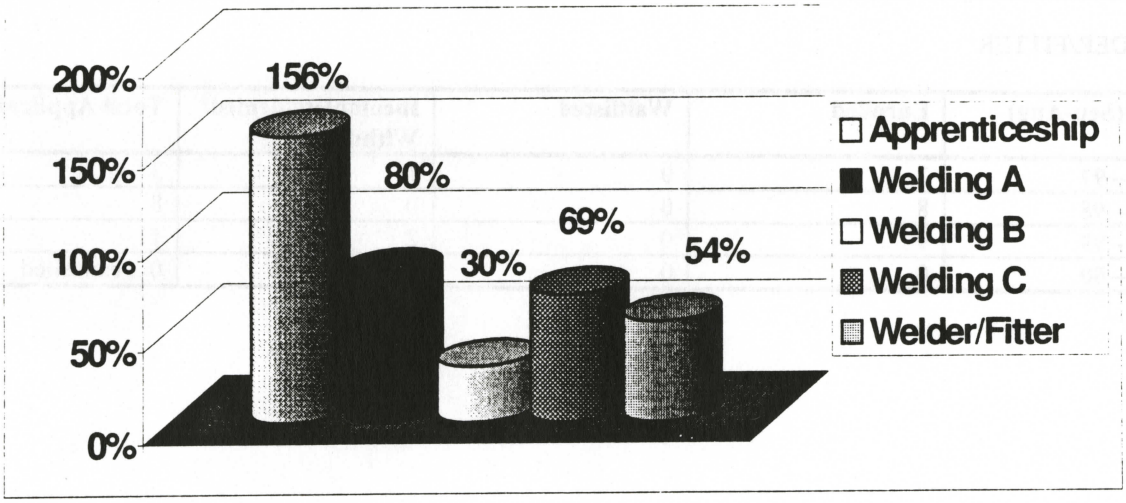
WELDING C

	1995 - 96	1996 - 97	1997 - 98	1998 - 99	1999 - 00	2000 - 01
Funded FTE:	32.0	32.0	32.0	32.0	32.0	28.0
Actual FTE:	22.0	16.0	22.6	23.0	22.1	
Utilization Rate:	69%	50%	71%	72%	69%	

WELDER/FITTER

	1995 - 96	1996 - 97	1997 - 98	1998 - 99	1999 - 00	2000 - 01
Funded FTE:	10.0	10.0	10.0	10.0	10.0	5.0
Actual FTE:	3.4	2.8	3.0	5.4	5.4	
Utilization Rate:	34%	28%	30%	54%	54%	

FTE Utilization 1999-2000



APPENDIX D
GENDER RATIO OF WELDING PROGRAM GRADUATES

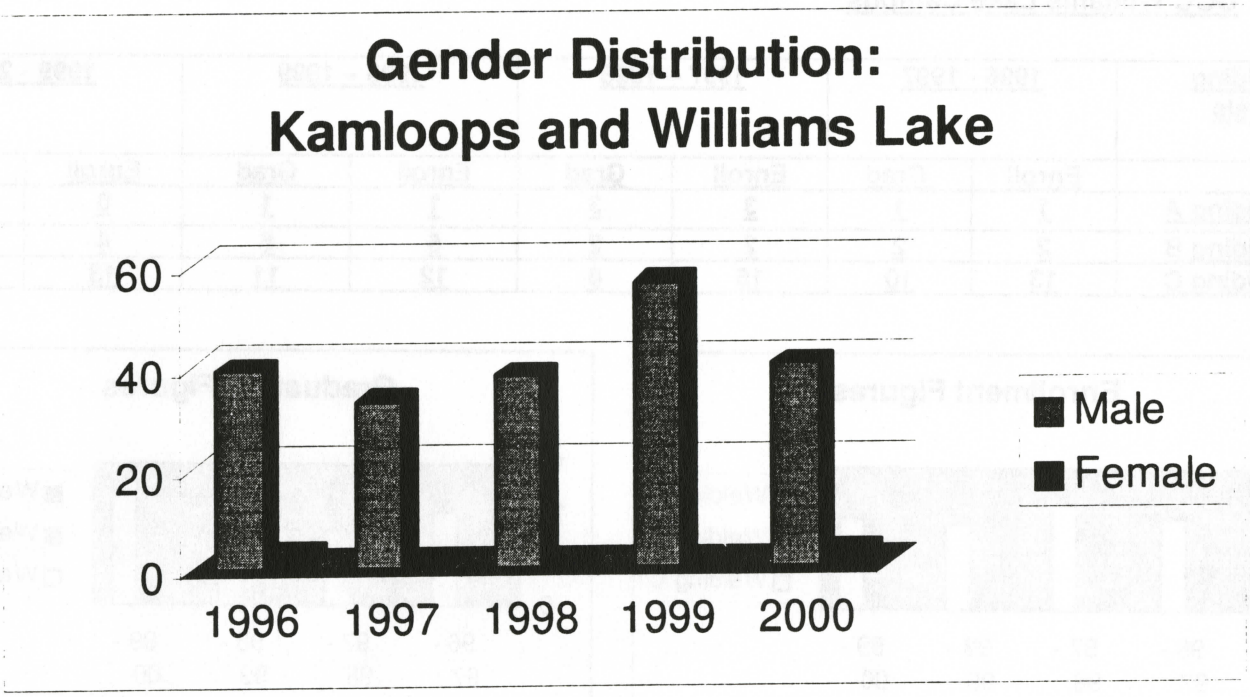
Source: Convocation Guide

KAMLOOPS CAMPUS

YEAR	MALE	FEMALE	TOTAL
1996	28	2	30
1997	23	1	24
1998	30	0	30
1999	45	0	45
2000	32	1	33

WILLIAMS LAKE CAMPUS

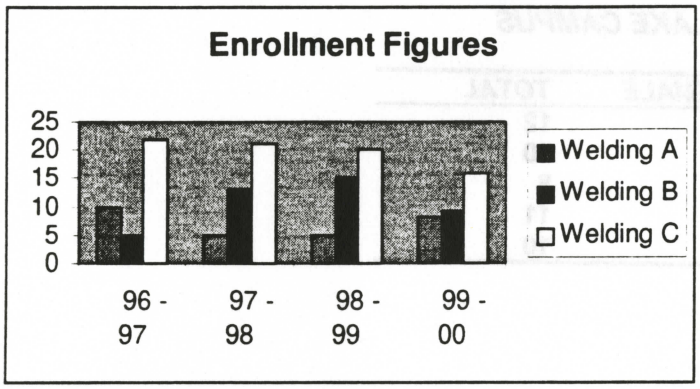
YEAR	MALE	FEMALE	TOTAL
1996	11	1	12
1997	10	0	10
1998	8	0	8
1999	11	0	11
2000	8	2	10

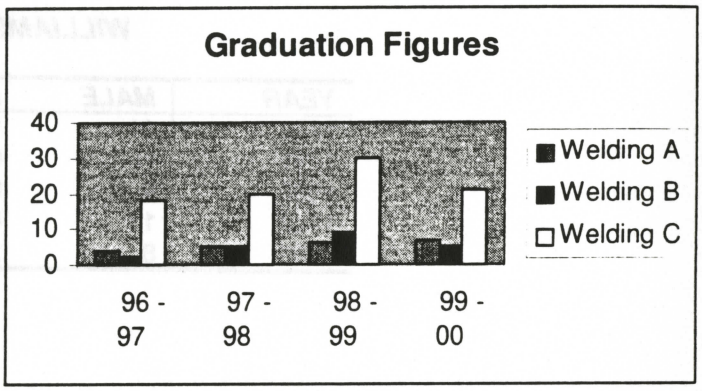


APPENDIX E
WELDING PROGRAM COMPLETION RATES

UCC Kamloops Campus

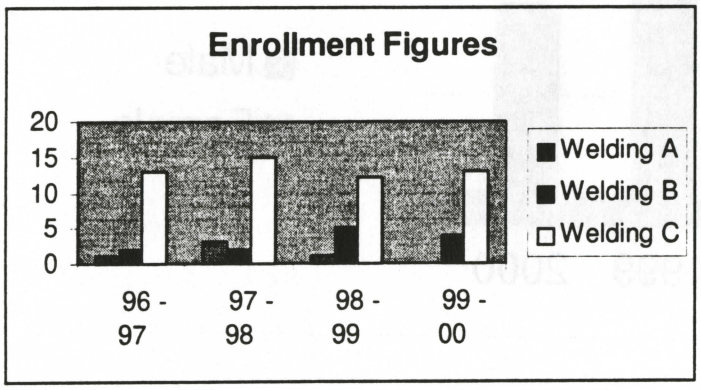
Welding Levels	1996 – 1997		1997 – 1998		1998 – 1999		1999 – 2000	
	Enroll	Grad	Enroll	Grad	Enroll	Grad	Enroll	Grad
Welding A	10	4	5	5	5	6	8	7
Welding B	5	2	13	5	15	9	9	5
Welding C	22	18	21	20	20	30	16	21

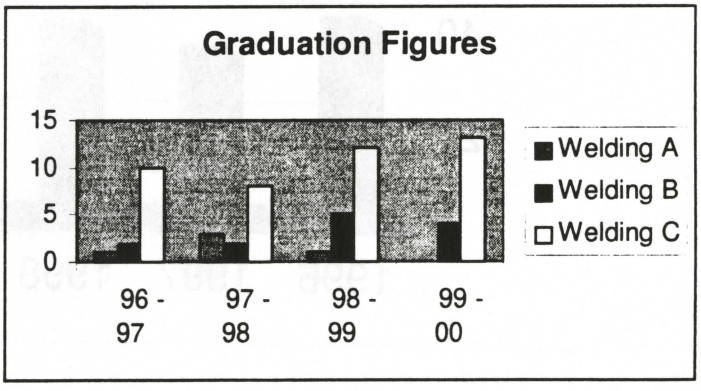




UCC Williams Lake Campus

Welding Levels	1996 - 1997		1997 – 1998		1998 – 1999		1999 - 2000	
	Enroll	Grad	Enroll	Grad	Enroll	Grad	Enroll	Grad
Welding A	1	1	3	3	1	1	0	0
Welding B	2	2	2	2	5	5	4	4
Welding C	13	10	15	8	12	11	13	10

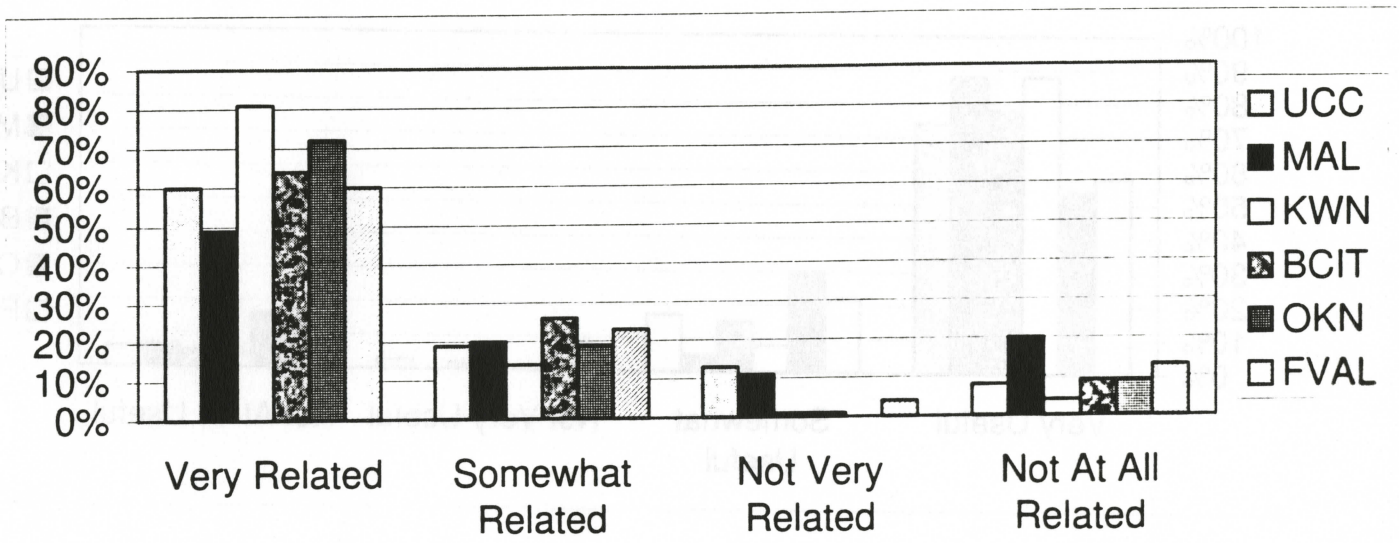




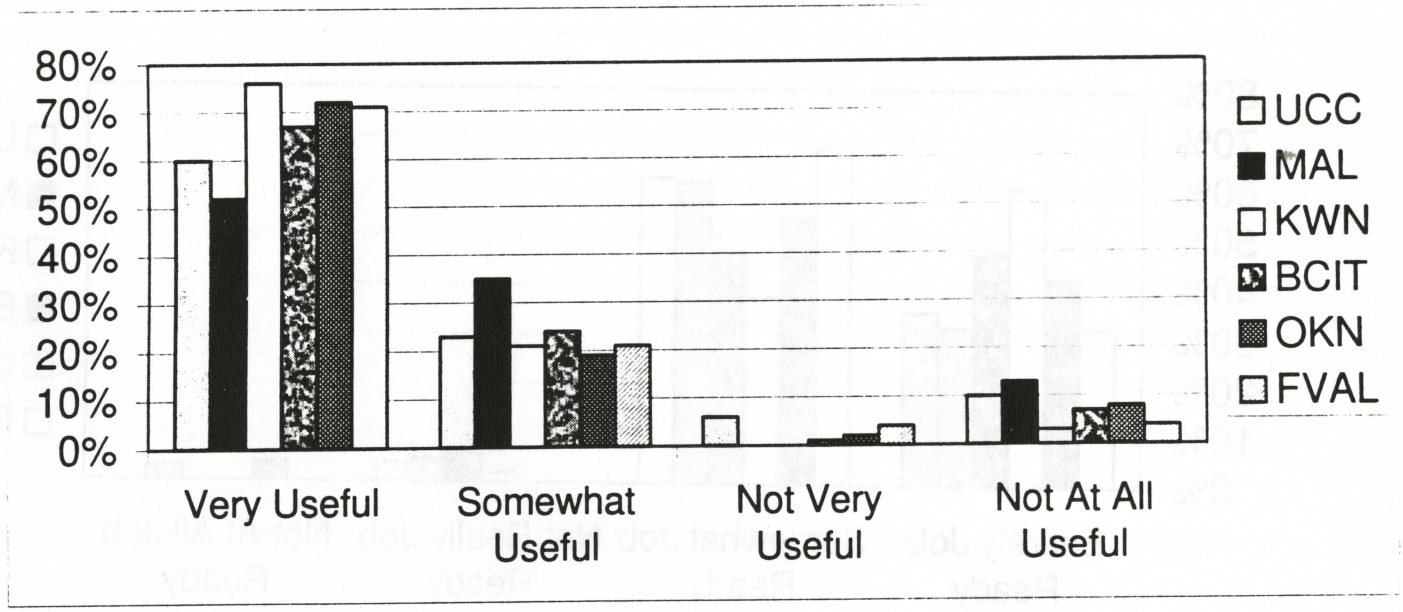
APPENDIX F
EDUCATION AND EMPLOYMENT OUTCOMES COMPARISON

Source: Student Outcomes Reporting System (SORS) 95-99

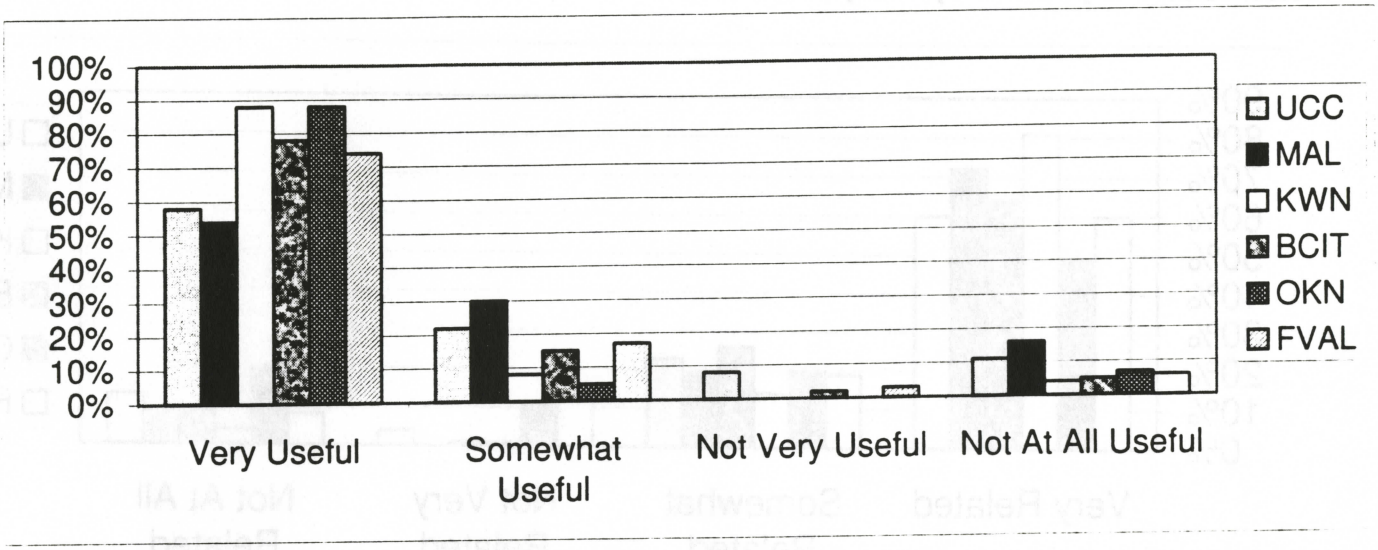
How related is your main job to your studies?



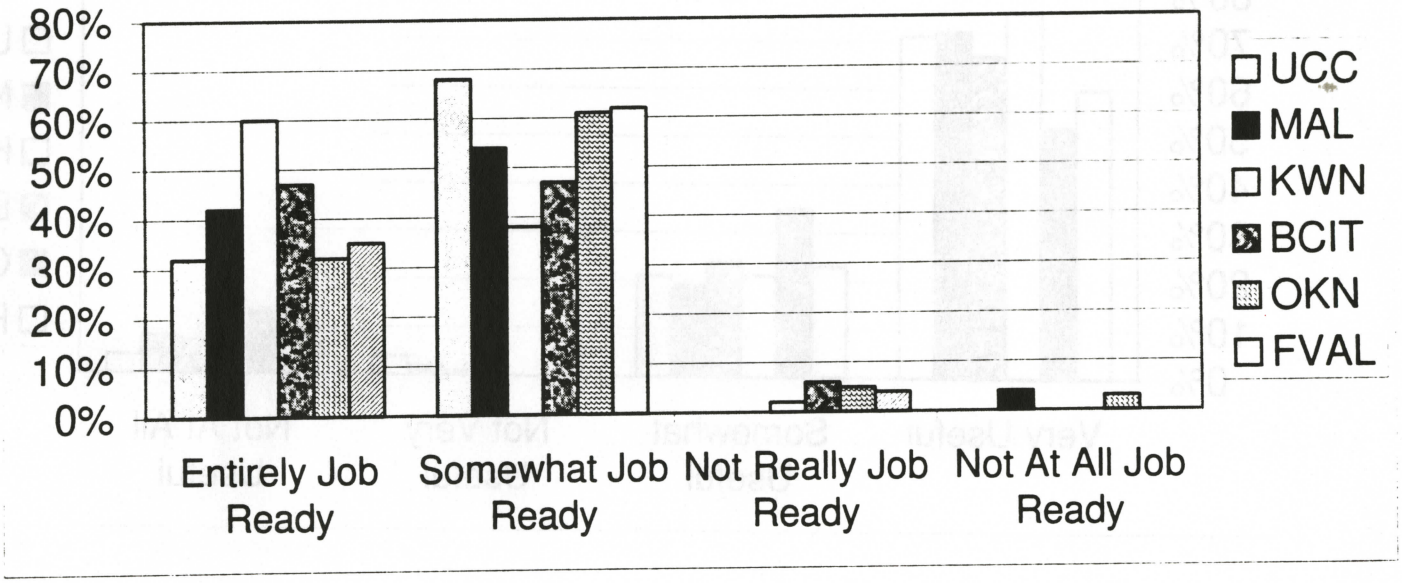
How useful was training in performing your job?



How useful was your education at our institution?

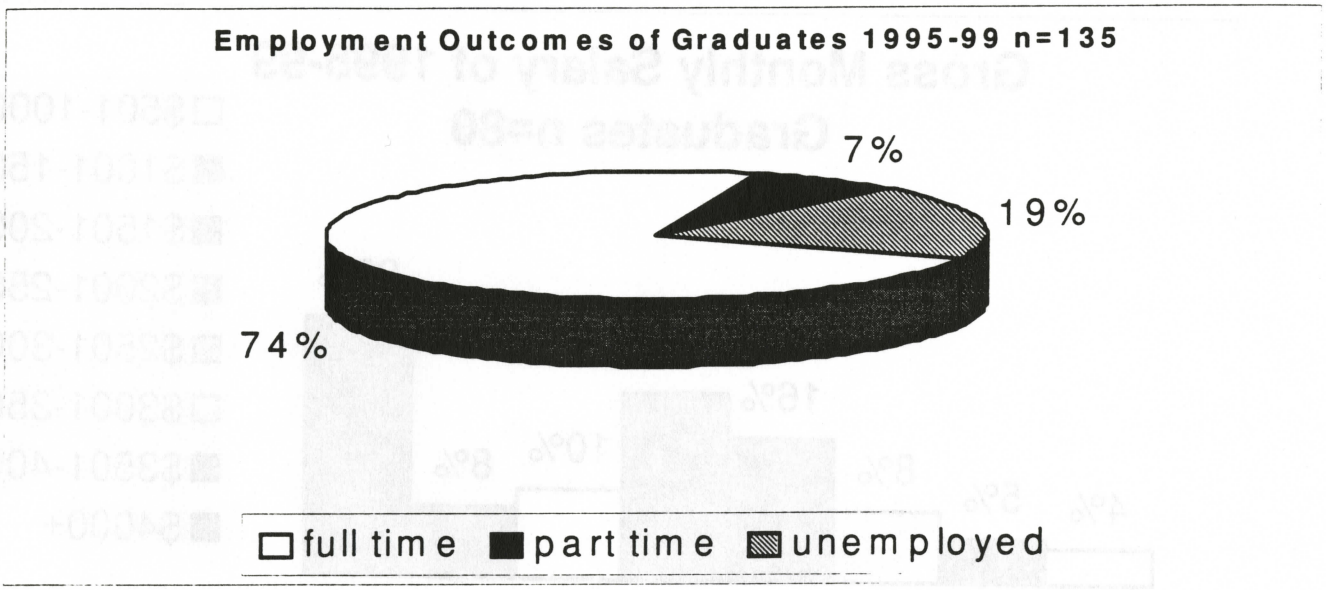


How "job ready" were you after leaving our institution?

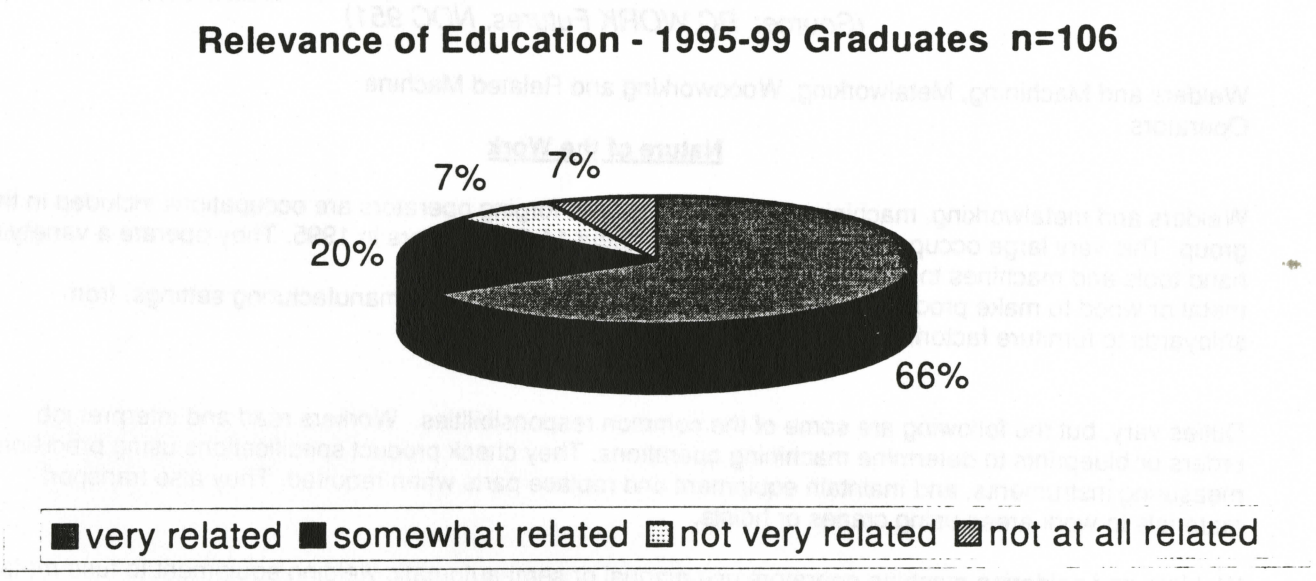


EMPLOYMENT RATES OF FORMER STUDENTS

Source: Student Outcomes Reporting System 95-99

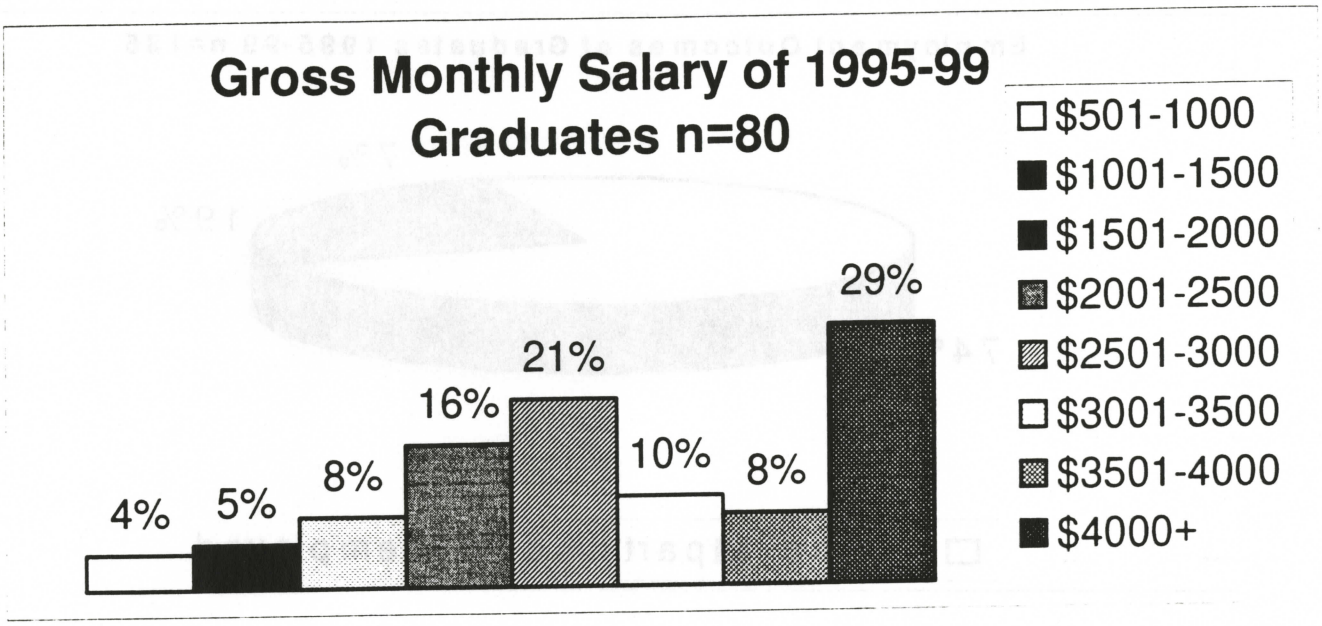


RELEVANCE OF EDUCATION



SALARIES OF FORMER STUDENTS

Source: Student Outcomes Reporting System 95-99



APPENDIX G
EMPLOYMENT PROSPECTS

(Source: BC WORK Futures, NOC 951)

Welders and Machining, Metalworking, Woodworking and Related Machine Operators

Nature of the Work

Welders and metalworking, machining, woodworking, and forging operators are occupations included in this group. This very large occupational group included about 11,680 workers in 1995. They operate a variety of hand tools and machines to fabricate, repair and bond either metal or wood to make products. They work in a range of industrial and manufacturing settings, from shipyards to furniture factories.

Main Duties

Duties vary, but the following are some of the common responsibilities. Workers read and interpret job orders or blueprints to determine machining operations. They check product specifications using precision measuring instruments, and maintain equipment and replace parts when required. They also transport materials to work areas using cranes or hoists.

Welders and soldering machine operators use manual or semi-automatic welding equipment to fuse metal pieces together. They use flame-cutting, brazing and soldering equipment. Heat is applied to the pieces to be joined, melting and fusing them to form a permanent bond. They use metal shaping machines such as brakes, shears and other metal straightening and bending machines. They generally plan work from drawings or by analysing damaged metal, using their knowledge of welding and metals.

Welders may specialize in certain types of welding such as custom fabrication, ship building and repair, pressure vessel welding, pipeline construction welding, structural construction welding or machinery and equipment repair welding. Welder apprentices and journeyed workers are also included in this group.

Education and Training

Welders learn their trade by apprenticing with a journeyed welder. Completion of Grade 10 is recommended, but many employers prefer that apprentices have completed Grade 12. Welders apprentice for three years, and this includes four periods of technical training. Training is offered at the British Columbia Institute of Technology, Camosun College, College of the Rockies, North Island College, Northern Lights College and the University College of the Cariboo.

Apprentices who have completed approved entry-level training or a co-op program may be granted credit towards an apprenticeship. Upon completion of on-the-job and in-school training, apprentices must pass an interprovincial standards exam before receiving a Certificate of Apprenticeship and a Certificate of Qualification, with an interprovincial Red Seal endorsement. A person who has documented evidence from employers of several years of work experience in the welding trade, but who has not apprenticed, may be eligible to write a challenge examination and receive trade certification. Local apprenticeship office staff can provide more detailed information about these exams and welder apprenticeships.

Working Conditions

Most people in these occupations work 40 hours per week. Some mills and processing plants operate on shifts during days, nights and weekends. Workers often belong to unions and entry-level workers typically make do with limited working hours before working up to a regular schedule. These workers are often required to stand for prolonged periods, as well as lift and fit heavy objects.

These workers are employed in various processing plants and settings where it can be noisy, dirty and dusty. For example, welders are occasionally in contact with rust and grease, and may be isolated for intervals while they work in booths constructed to contain sparks and glare. In some work settings, workers are exposed to different types of machinery and toxic gases and fumes. In other settings, working conditions are much better, and workers encounter few hazards or discomforts.

Avoiding injury becomes easier with experience, but there are many other preventive factors that are extremely important. Workers must be cautious and use proper safety measures. These include wearing hard hats, eye and hearing protection, safety clothing, and boots.

This is a very large occupational group which declined very slightly in size from 11,720 in 1990 to 11,680 in 1995. The majority of workers in this overall group (66%) are welding and soldering machine operators. Of these machine operators, over two-thirds are welders. The two other big groups are woodworking machine operators (15%) and metalworking machine operators (9%).

Self-employment among these workers is low (5%) because they are generally employed in mills, plants, and companies. However, welders, soldering machine operators and woodworking machine operators have a higher rate of self-employment than the other workers in this group. The range of self-employment rates for these particular occupations varies from 5% to 8%. By comparison, the rate of self-employment across all occupations in B.C. is 11%.

A large share (95%) of workers in this occupational group work full time, either for the full year or for part of the year. The proportion of people who work part time is 5%, which is much lower than the provincial average of 22%.

The unemployment rate for this group is higher than the provincial average. Employment demand for workers is affected by economic market conditions in the industries which employ these workers. Seasonal work is generally not a factor.

These workers are employed in a range of industries. They work primarily in metal fabrication (17%), wood manufacturing (16%), other service industries (13%) and construction (10%). Note that metal fabrication includes fabricating boilers, metal tanks, structural metals, and other metal products. Wood manufacturing includes sawmill and planing mill products, veneer and plywood, prefabricated wooden products, wafer board

and particle board. Service industries include welding and other repair services. Many of these workers are located in the Lower Mainland (52%). The rest of the workers in this group are located in the Okanagan/Kootenay region (19%), on Vancouver Island (14%) and in Northern B.C. (15%). Women make up a very small proportion (4%) of this group. The B.C. all-occupation share of women workers is 45%. About one-third of the women who have found work in this occupational group are employed as woodworking machine operators. A few others have found work as metalworking machine operators, welders and soldering machine operators.

Compared to other occupations, the age distribution of this group is fairly average, although there are fewer workers (11%) under the age of 25 than the all-occupation average.

Employment Prospects

This is a very large occupational group with employment estimated at 11,690 workers in B.C. in 1995. Employment for this group as a whole is projected to grow about as fast as the average for all occupations through to 2005. This is despite the lack of growth from 1990 to 1995. Overall, strong growth in services dealing with metal-related industries is expected to be the source of most job growth. Other industries that are expected to contribute to job growth are the metal fabrication industries, primary metals manufacturing and construction. In this occupational group, there are projected to be 1,980 employment openings due to growth and 1,820 employment openings due to replacement needs between 1995 and 2005.

Welding and soldering machine operators make up the largest occupation in this group with almost 7,500 workers in 1995. Employment for these welding fields is projected to grow about as fast as the average for all occupations and provide close to 2,500 total openings from 1995 to 2005. These openings are expected to come both from anticipated new job growth and from the need to replace workers leaving the occupation.

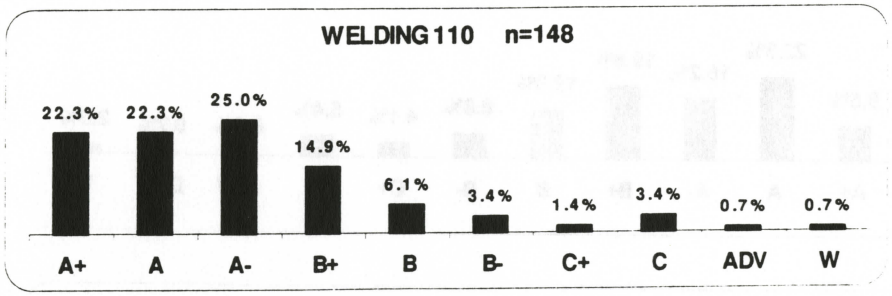
These workers are mainly affected by activity in the welding, metal fabrication and construction industries. The metal fabrication industry slowed in the early 1990s and workers were let go from employment. This downsizing forced many skilled workers to seek employment in other occupations or retire. Industry sources expect the employment outlook to improve over the next 10 years because more workers will be retiring and skilled workers will be needed to replace them. However, employment demands for these workers will fluctuate with the booms and busts of the construction industry.

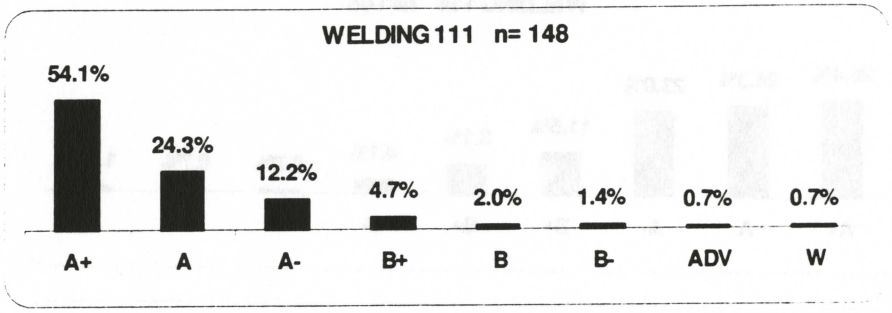
Trends and Projections

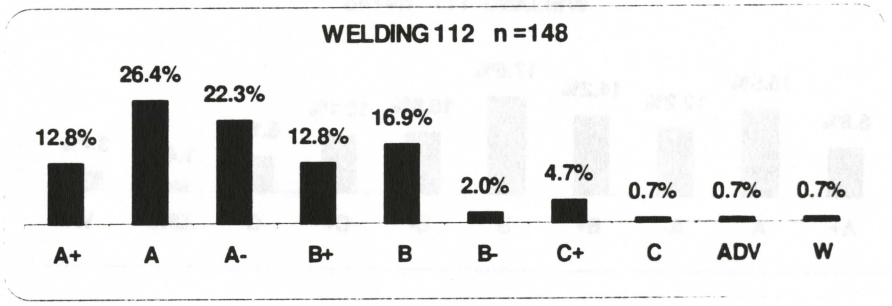
	1990	1995	2005
Number Employed	11720	11690	13670
Estimated Openings 1995-2005	**Growth (Net)**	**Attrition**	**Total**
	1980	1820	3800

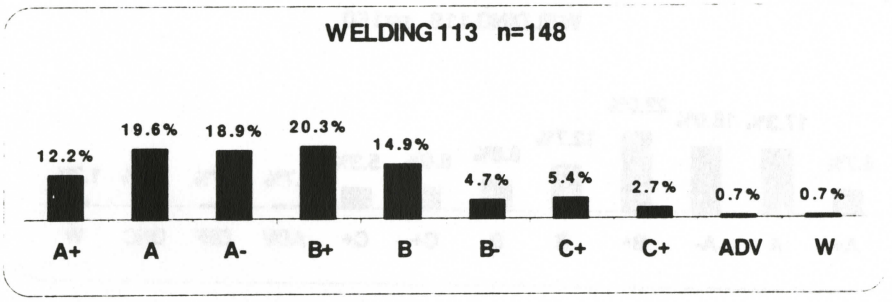
Annual Growth 1995-2005	1.6%
Main Industries of Employment	
Metal Fabrication	17%
Wood	16%
Other Service Industries	13%
Employment by Region	
Lower Mainland	52%
Vancouver Island	14%
Northern B.C.	15%
Okanagan/Kootenay	19%

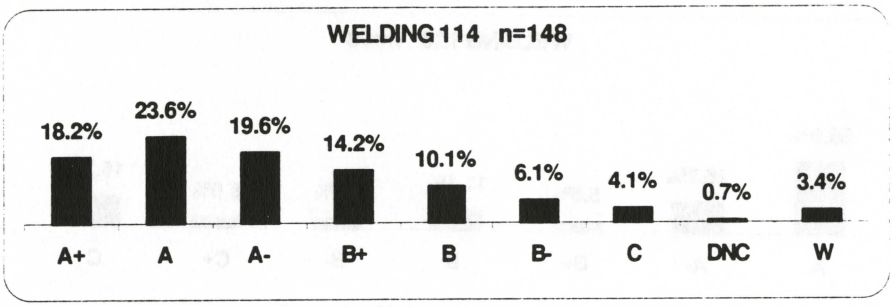
APPENDIX H
GRADE DISTRIBUTIONS: 95/FA - 00/WI











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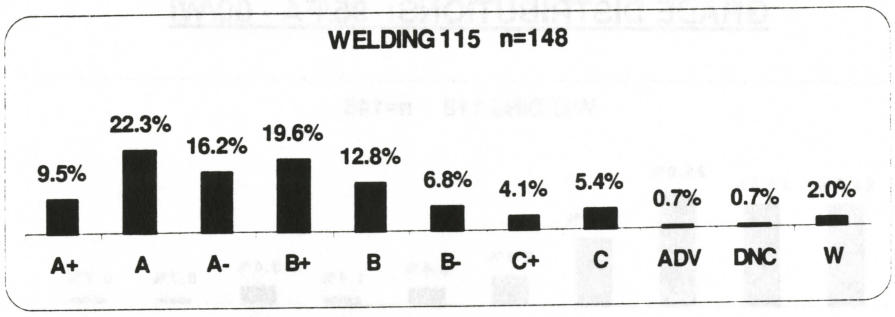

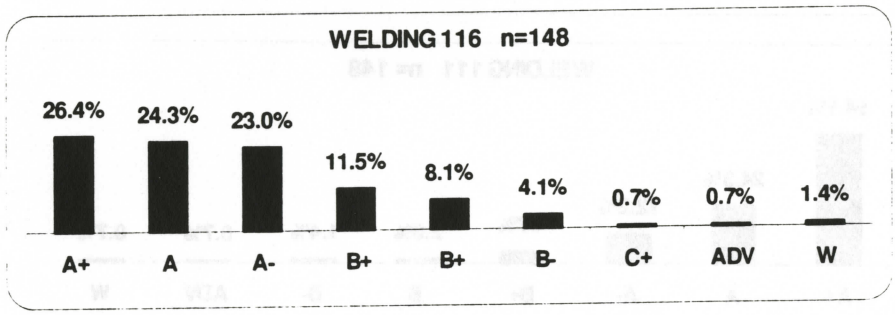

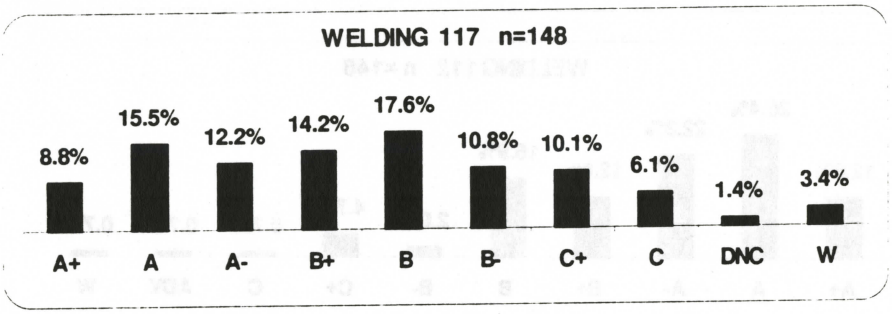

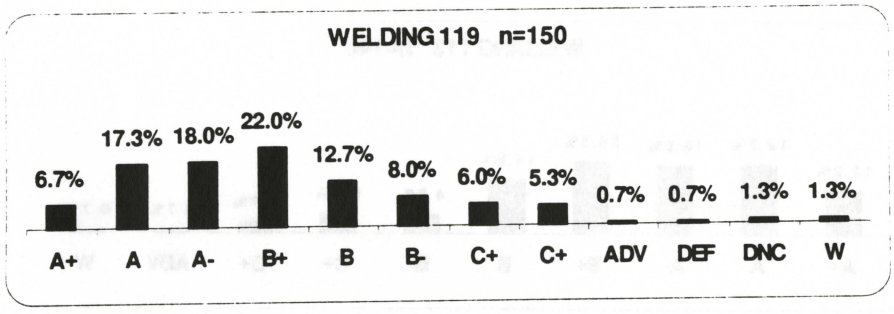

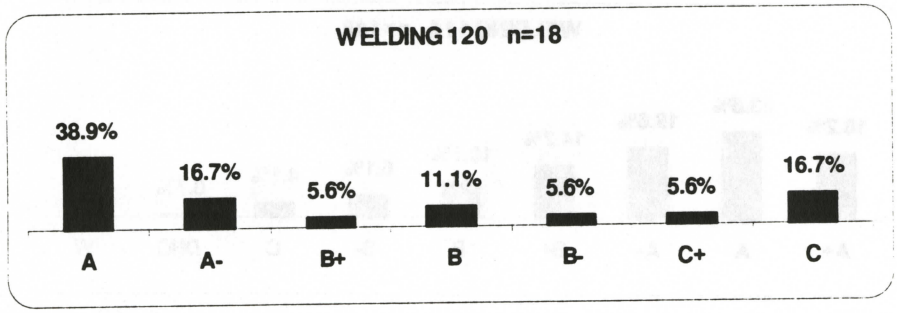

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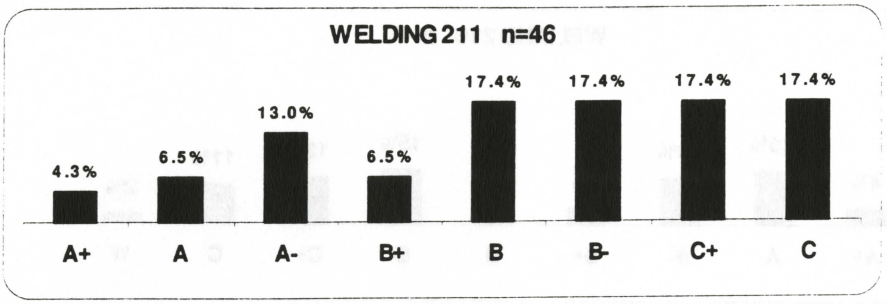

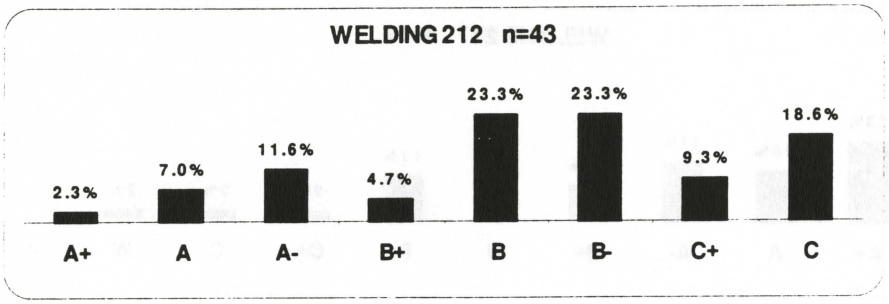

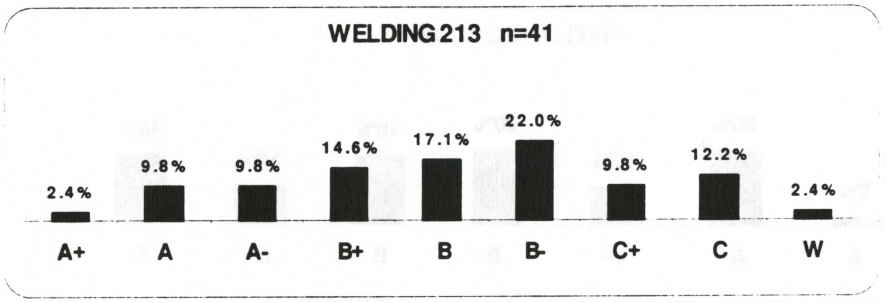

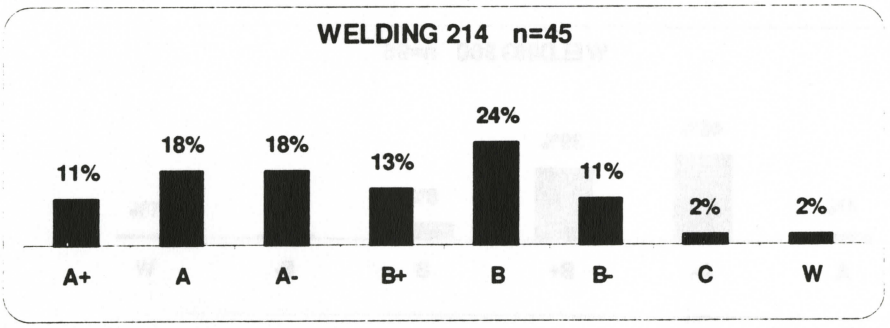

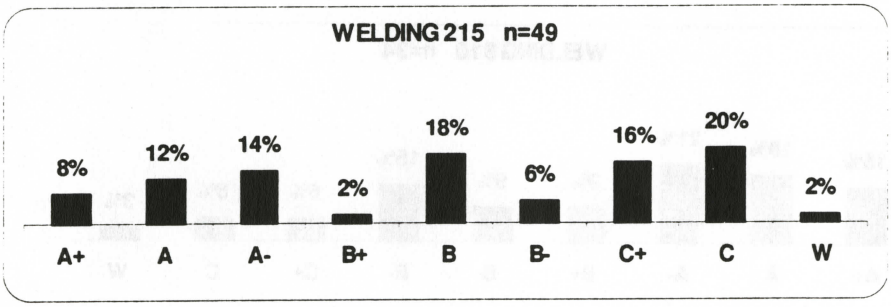

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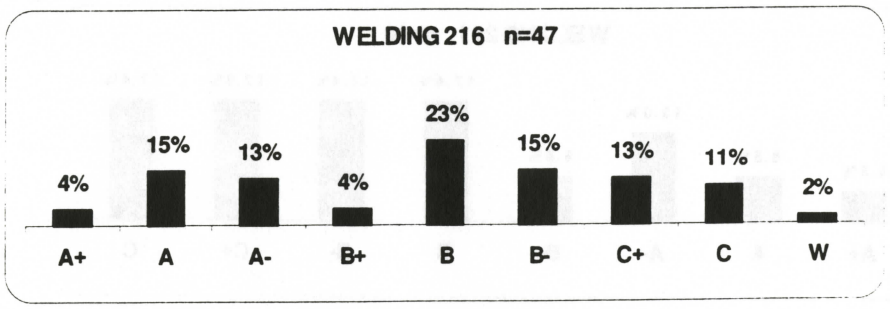

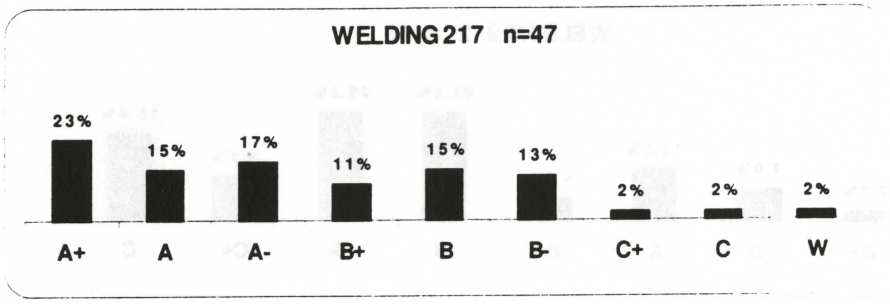

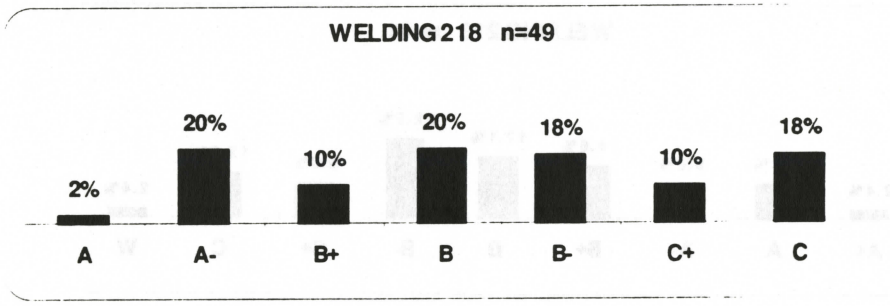

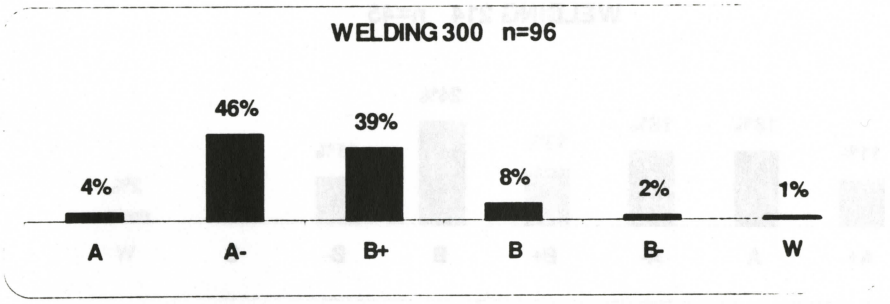

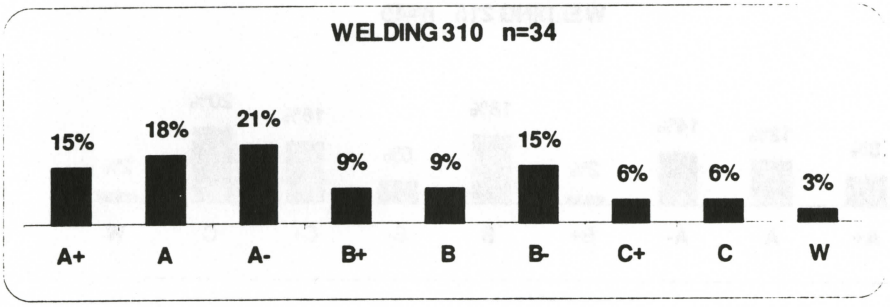

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